



Course on Ultrafine Diesel Particles and Retrofit Technologies for Diesel Engines

Dates: November 12, 13, 14, 2008

Location: South Coast Air Quality Management District,
21865 Copley Drive, Diamond Bar, California 91765

Chairman: Dipl.-Ing Andreas Mayer, TTM, Niederrohrdorf, Switzerland

Note: Pre-registration is required. To sign up, please go to:

<http://www.arb.ca.gov/diesel/verdev/registration/index.php>

Enter the requested information. Course fee of \$250 payable to the address shown, must be received by October 29, 2008.

Course Agenda

November 12, 2008

8:30: Welcome: Erik White, Chief, Heavy-Duty Diesel In-Use Strategies Branch, California Air Resources Board

8:50: Introduction:

John J. Mooney, President, Environmental & Energy Technology and Policy Institute.

Part 1: MOTIVATION AND TARGETS

9:15: Health effects due to solid ultrafine particles.

Professor Dr. Alison Elder. Professor University of Rochester

9:45: Clean air targets for California – Diesel Emissions and the Role of Research for informing Policy.

Dr. Alberto Ayala, Chief, Climate Change Mitigation and Emissions Branch,
Research Division, California Air Resources Board

Discussion Part 1: 10 minutes

Part 2: PARTICLE PHYSICS AND METROLOGY

10:20: Physics of solid particles emitted by IC-engines

Dr. David B. Kittelson, Professor of Mechanical Engineering, F.B. Rowley Chair
in Mechanical Engineering; Director, Center for Diesel Research Department of
Mechanical Engineering, University of Minnesota

10:45: Metrology and instrumentation

Dr. Markus Kasper, President and General Manager, Matter Engineering GmbH

Discussion Part 2: 10 minutes

11:20: Course Break (10 minutes)

Part 3: PARTICLE FILTRATION OF DIESEL EXHAUST

11:30: Physics of filtration of particles

Dr. Hans-Juergen Rembor, HUSS

11:55: Filter media – ceramics, metal and fibers

Noah Loren, GEO2 Technologies

Discussion Part 3: 10 minutes

Part 4: REGENERATION OF FILTERS

12:30: Challenge to clean filters from collected soot

Dr. Michael Streichsbier, Cleaire

12:55: Lunch Break (60 minutes)

1:55: Catalytic-based surfaces for filter regeneration

Dr. Claus Goersmann, Johnson Matthey

2:20: Fuel borne catalysts for filter regeneration

Dr. Paul Richards, Research Fellow, Innospec Ltd., UK.

2:45: Diesel burners for filter regeneration – also supported by catalysis

Dr. Hans-Juergen Rembor, HUSS

3:10: Disposable Filter and DPF-Systems with Regeneration Procedures through Electrical Heating

Ulrick Lampen, Product Manager, Mann+Hummel

Discussion Part 4: 10 minutes

Part 5: APPLICATIONS

3:45 Available and approved technology

Andreas C. R. Mayer, Technik Termische Maschinen (TTM)

4:10: Course break (10 minutes)

4:20: Matching of Particle Filter System to a given application

Dr. Hans-Juergen Rembor, HUSS

4:45: Effects on engines and effects by engines

Francois Jaussi, AKPF

5:10: On-board detection/control and electronic management

Robert Grodde, Car-Parts Kuhn

Discussion Part 5: 10 minutes

End of Day 1 (Nov. 12, 2008) Closing Remarks

6:00: Reception / Dinner (site not chosen – under discussion)

November 13, 2008

8:15: Opening Remarks

Part 6: VERIFICATION AND QUALITY CONTROL

8:20: California ARB Verification of Particle Filter Systems

Shawn Daley, Verification Procedures, ARB

8:45: Multimedia Verification for Fuel Borne Catalysts (Fuel Additives)

Floyd Vergara, Multimedia Systems, ARB

Discussion Part 6: 10 minutes

Part 7: EXPERIENCE

9:20: 4 Million BAT-Filters successfully in cars

Dr. Gerard Belot, retired Peugeot, Automobile Expertise

9:45: Heavy-duty Vehicle Original Equipment application for US 2007

Dr. Z. Gerald Liu, PhD, PE. Director – Research, Cummins Emission Solutions.

10:10: Course Break (15 minutes)

10:25: ARB / AQMD Showcase – 240 off-road vehicles/equipment

John Karim, Testing and Field Support Section, ARB

10:50: Locomotives and Ships

Christhof Hug, Hug-Engineering

11:15: CRT: 1,200 Berlin buses retrofitted since 2000

Burkhard Eberwein, Technical Director, Bus Division of Public Bus Transport Company, City of Berlin.

11:40: 10,000 buses and construction machines in London

Matthew Vincent, Consultant for Low Emission Zones

12:05: 20,000 construction machines in Switzerland

Francois Jaussi, AKPF

12:30: Retrofit in the U.S.

Kevin Brown, Engine Control Systems

12:55: Lunch Break – AQMD cafeteria (45 minutes)

1:40: Typical failures and how to avoid them

Andreas C. R. Mayer, TTM and AKPF

2:05: DPF technology in underground mines.

Dr. Alexander Bugarski, aerosol scientist, expert on occupational diesel aerosol exposure, assessment and control, NIOSH, Pittsburgh

2:30: Influences of fuels and lubricants

Frank Machatschek, Shell

Discussion Part 7: 15 minutes

3:10: Course Break (10 minutes)

Part 8: SECONDARY EMISSIONS

3:20: Toxics generated and emitted by filters

Dr. Norbert Heeb, EMPA, State Laboratory for Analytical Chemistry

Discussion Part 8: 5 minutes

Part 9: COMBINED SYSTEMS – DPF + NO_x REDUCTION

3:50: Soot-elimination + NO_x- reduction combined

Dr. Joseph Kubsh, Executive Director, Manufacturers of Emission Controls Association (MECA).

Closing - End of Course

Adewale Oshinuga, South Coast Air Quality Management District

5:00: Note: The following is under discussion as an adjunct to the Course. Convene Round Table Discussion of Fuel Borne Catalysts (Fuel Additives). Benefits, Negatives and Concerns. Where do we go from here?

Dr. Gerard Belot, Floyd Vergara, Professor Dr. Alison Elder, Dr Norbert Heeb, Professor Dr. David Kittelson, Alexander Bugarski, Dr. Z. Gerald Liu, Dr. Paul Richards, Shawn Daley, Andreas Mayer, and engineers and scientists interested in this subject.

November 14, 2008

Part 10. TOUR OF SELECTED FIELD 'SHOWCASE' SITES

8:30: Tour of Selected Construction-sites.

John Karim, ARB.

Tour will include 2 or more construction-sites that are participating in the ARB. AQMD, and MSRC supported "Showcase" where construction machines have been retrofitted and can be viewed in actual deployed use. Talk to operators, equipment owners, and site management. Arrangements to be made by CA ARB under the guidance of Erik White, Chief, Heavy-duty Diesel In-Use Strategies Branch, and John Karim, Head of Testing and Field Support Section. Note: Details for the tour, transportation, parking, and timing are still being developed. More details will be announced by ARB in the next weeks

Information Sources for Particle Filter Technologies and Training Aids:

Text Books related directly to the course:

- 1) Andreas Mayer and 81 Co-Authors, "Elimination of Engine Generated Nanoparticles." Haus Der Technik-Fachbuch, Band 58, Essen, Germany. ISBN 3-8169-2552-9. 2005
- 2) Andreas Mayer, et al, "Particle Filter Retrofit for all Diesel Engines." Haus Der Technik-Fachbuch, Band 58, Essen, Germany. ISBN 978-3-81659-2850-8. 2008
- 3) FOEN/Suva Filter List – <http://www.environment-switzerland.ch/uv-0607-e>



CORNING

